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The Ultimate Generalization

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THE

ULTIMATE GENERALIZATION:

AN EFFORT

IN THE

PHILOSOPHY OF SCIENCE.

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PREFACE

THAT Science has a philosophy is well known to all who have any proper conception of what is meant by the theory of Evolution. In the following pages that doctrine is assumed as already virtually established. The main conception which it is their object to set forth is itself an illustration of the progress of ideas from the indefinite to the definite, for it has been hinted at by thinkers in all ages, while later ones have approached it till they have almost had it in their grasp. The development of it into its full breadth and universality, taking that to be possible, might be called a larger integration of thought or knowledge than has ever yet been evolved.

Instead, however, of regarding the evolution theory as "a philosophy of creation (already) carried as far as the human mind can penetrate," this essay makes the attempt to take still another step. Neither does it accept *any* limitation, hitherto set, of the field, or of the possibilities, of scientific investigation; on the contrary, it asserts the domain and the future achievements of science to include The All, in a larger sense than ever before claimed.

That which is presented as The Ultimate Generalization has the merit of being grandly simple—so exceedingly simple that to minds not entirely divested of their

original superstition it may appear inconsequential. Yet simplicity is the characteristic of great truths, and this, if it be one, will be found to have consequences of the utmost importance.

In the way of apology it should be explained that on account of various unfavorable circumstances the work is unavoidably too much condensed, and otherwise imperfect, to do anything like justice to many of the ideas advanced. It is the first, crude attempt to establish the new (yet old) conception, and the writer is only able at present to bring together some general masses—the large lumps, so to speak—of evidence in its favor. For the same general reason there are some statements that must appear dogmatic; they are so written, not because dogmatism is expected to have any influence, but with a view to suggest as much as possible in addition to what is said.

The cry of "Eureka" has been too often made by self-deluded thinkers. However it may be in the present instance, the qualified and candid reader will not fail to perceive that the supposed ultimate induction is placed for support upon a field of evidence which in extent is absolutely universal, and that it is confidently trusted to the future progress of science for its fate.

THE

ULTIMATE GENERALIZATION.

The nature of Generalization.

THE method of careful, systematic, and thorough generalization or induction is the method of modern Science, as distinguished from the various methods—analytical, introspective, and deductive—pursued by Speculative Philosophy. In its nature this process is the discovery of the one in the many—of unity in variety—of one characteristic in a plurality of different things—one explanation for a number of occurrences—one motive in various deeds—one cause in a variety of effects—one substance under many forms—one genus in more than one species—one law in many diverse facts; it is the inclusion of the special under the general, and of the general under that which is more general.

The ideal Ultimate Generalization.

What is meant by the conception of an *ultimate*[1] generalization is, then, a *universalization*—an induction that covers everything

[1] *Ultimate* in the sense of being the last and highest point to be attained in the ascending progress of science—the movement toward larger and still larger inductions. Of course there is no limit

—a unity apparent in all other unities—a generalization of all other generalizations—a one thing common to all laws and facts, exemplified and illustrated in everything we know—a one absolutely universal fact present in every other, in the same sense that the characteristic of the genus is present in every species of that genus.

Tendency to large Generalizations.

The beginning of science in any department is the period of small or narrow generalizations; but as knowledge increases—as more and larger departments are brought under investigation—they become wider, or more inclusive, and thus the tendency to large inductions has become very strongly apparent at the present time. "In the present generation," says a German professor, "the several physical sciences have entered into the closest organic union: physics and chemistry, along with mathematical astronomy and geology, have been blended into a new science —the history of the development of worlds; palæontology, systematic botany, and zoölogy have been joined in a united science of organisms, the physiology of plants and animals becoming coalesced in universal biology; the boundary between the organic and inorganic aspects of nature is being ever more and more obliterated, and out of the several natural sciences a single, uniform, universal natural science is being constructed."

Science, moreover, has already arrived at some of

to the generalizing process, or to the number of minor generalizations. Its *universality*, too, has a new and very large meaning; for, though every law is universal—that is, extends wherever in time and space its domain or subject-matter extends—yet the domain of this includes all domains, and its universality is equal to those of all other universals together.

the most important unities. Among them are—the *nebulous condition* of matter as the *origin* of all cosmical bodies and movements; the *atomic constitution* as common to all material substances; the idea of *motion* as the unity of *nature* in all forms of force; *natural selection* as a common mode of *origin* and *conservation* in the characteristics, physical or mental, of all vegetal and animal species. Herbert Spencer has given us the perception of *likeness* and *unlikeness* as the oneness of all *mental processes;* the *rhythmic cycle of action and reaction* as the *constitution* of all movement; *force* or the *persistence of force*, as the one *cause* existing in all causes; and *evolution* and *dissolution* as the summing up of all phenomena in one common movement, tendency, end, or purpose.

Great inductions already reached.

These are all genuine inductions. They may be taken as thus far the most extended reaches of science; and be considered as already accepted, or soon to be, by the generality of scientific men.

Their validity.

Mr. Spencer has gone farther and put forth his conviction of an unknowable *Absolute* as the final unity underlying all things, and manifesting itself by the persistence of force.

Mr. Spencer's final unity.

Now, taking Mr. Spencer as the representative of Science, the first inquiry to be raised in this essay is, Whether the Unknowable thus placed by him at the bottom of things, and to which, as he conceives, every line of investigation conducts us, is a true ultimate generalization; or, if not, is there any other of the great inductions above named that may be so considered?

Test of great Inductions as *ultimate.*

Test of the Unknowable.

Comparing the Unknowable with the definition that has been given, let us ask, Is the Unknowable present and exemplified in all we know? Is the Absolute illustrated by the Relative? Does every fact and class of facts furnish an explanation of what is meant by the Absolute or Unknowable, as every species exhibits the genus, as all falling bodies illustrate gravitation, or as every organism exemplifies evolution? An affirmative answer to such questions is absurd. All that can be said by those who hold the view of Mr. Spencer is that from every fact and class of facts can be drawn, as they believe, an *evidence*—not *illustration*—of the underlying and unknowable Absolute.

The Persistence of Force is considered by Mr. Spencer as the obverse side of the truth that the unknowable Absolute is itself persistent; and so defined may perhaps be looked upon as already just disposed of. But aside from any connection with the Unknowable, it is still deemed by him the largest of all truths. In his own language, "this being the ultimate truth which transcends experience by underlying it, so furnishing a common basis on which the widest generalizations stand, these widest generalizations are to be unified by referring them to this common basis."[1] In regard to this, then, we may inquire, Is persistence of force exemplified by the vertebrate and invertebrate *forms* of structure in animals? or by the pitch and timbre, melody and harmony of sounds? Not in the sense that has been defined; we can only say it is present in these as their ultimate *cause*, as matter, solid or gaseous, is present as the *material* without which they could not be produced.

First test of Persistence of Force.

[1] *First Principles*, Am. Ed., p. 398.

Second test of Persistence of Force.

But it is held by Mr. Spencer that matter is known only through experiences of force; or, in other words, is a manifestation of it, *force* being the more inclusive term. Yet it is as true that force is known only through matter as that matter is known only through force; for force cannot be conceived as affecting us, or acting in any way except as it is *conveyed* by bodies or atoms of matter. He himself, in treating of ultimate ideas, and attempting to show the incomprehensibility of both matter and force, asserts the equal importance of each. His words are, "Matter is known to us only through its manifestations of force; our ultimate test of matter is the ability to resist; abstract its resistance and there remains nothing but empty extension. Yet, on the other hand, resistance is equally unthinkable apart from matter—apart from something extended."[1] If in another place[2] he apparently contradicts this by saying that the conception of matter "is built up of experiences of force," while "experiences of force are not derivable from anything else," it is equally correct (or incorrect) to reverse the statement, and say the conception of force is derived, as just shown, from experiences of matter, but experiences of matter are not derivable from anything else. Still further, the persistence of force cannot be proved without assuming the persistence of matter. The experimental evidence is that the amount or quantity of force remains, under various forms, always exactly the same, as measured by certain units of force. And "the units of measure from which all others of any exactness are derived are units of linear extension. From these, through the medium of the equal-armed lever or balance, we derive our equal

[1] *First Prin.*, pp. 58, 59. [2] *Ib.*, p. 169.

units of weight, or gravitative force."[1] But units of linear extension can be relied on for exactness only by assuming that the *material* unit—the rule, meter, or scale used in practically applying them—remains unchanged in its size and form; for if it vary in either of these—if it become larger or smaller in size, or shorter and wider, narrower and longer, curved or twisted, in form—there is no exactness, the proof is uncertain; for which reason the best instruments of measurement are made from the most unvarying materials. Ultimately the test of all other units comes to be the recognized *material* standard unit of length, which is assumed to constantly retain its size and form. The assumption thus made is then a double one; it is not only that the quantity of matter in the rule or unit finally appealed to has remained unchanged, but also that, in the absence of any force to act upon it, it has retained its form; that is, that the matter composing the unit, besides being persistent in its quantity, is *passive* or *forceless*. The cohesive power holding it together is supposed to be relatively unvarying, and the still underlying assumption is of a something held together which of itself is passive, and incapable of changing its form. If it be said this does not show that matter *must* persist, the reply is that the only experimental proof of that is the persistence of its gravitative force; and the reliability of this evidence finally depends, as just explained, on the assumption that matter *does* persist. If it still be said that to assume the persistence of matter is to assume the persistence of the force manifested by matter, the reply is again, by a reversal of terms, that to assume persistence of the force manifested by matter is to assume persistence of the matter which

[1] *First Prin.*, pp. 186, 187.

manifests it. The persistence of matter is therefore an assumption quite as primordial as that of the persistence of force. And the reasonings used by Mr. Spencer (see "First Principles," pp. 177, 178, 187, 188) to show that persistence of force is the primary, unprovable assumption, are equally good, with a change of terms, to show that persistence of matter is such an assumption. Persistence of force is accordingly no more the one fact present in every other than the persistence of matter is such an ever-present fact; while the generalization contemplated is one that shall include, and be exemplified in, both of these great persistences.

Test of Evolution and Dissolution.

Does the double law of Evolution and Dissolution, which Mr. Spencer holds to be the largest *induction*—the summing up of all phenomena—answer the requirement any better than Persistence of Force? Not at all; Evolution does not present itself in the phenomena of dissolution, nor does Dissolution illustrate the idea of evolution; while neither of them is exhibited in the characteristics of the elementary *materials* used in these reverse processes; as, for instances, the chemical elements, and the scales of colors and sounds. Each of them can cover only one-half the phenomena of universal *movement;* whereas, the induction described as the *ultimate* must be one that will cover the whole—must be exemplified in both evolution and dissolution, in all their stages and departments; and also in the qualities of the *elements* with which evolution begins and dissolution ends.

Of Rhythm of Motion.

Neither does the Rhythm of Motion come any nearer the test, for it is not yet proposed to talk of the Rhythm of Matter. The law extends over only one of these great domains, while the true thing

should take in both of them, if not Space and Time besides.

Of Subject and Object.

The distinction of Subject and Object, described by Mr. Spencer in one place as an ultimate truth, is not presented as one of the same kind as those already considered, but as the division of all experiences into their two most general classes. The generalization to be sought, moreover, cannot be dual, like this distinction of generalized classes, or like Evolution and Dissolution, for then it is not strictly universal—the *one* thing in all others; while it must characterize all true *classifications*, like this, as well as those generalizations called laws.

None of them the Ultimate.

As the great truths that have here been tested are the most largely inclusive of any yet arrived at, it is safe to say there is nothing offered by Science that can be called a truly universal induction.

Question of its Possibility.

Further than this, the possibility, even, of such an induction has been denied; both by Mr. Spencer (unless Evolution and Dissolution can be taken for it) and by Auguste Comte, his chief predecessor in the effort to organize all the sciences into a consistent philosophical system.

The latter thinker, having the conception in his mind when writing the first part of his "Positive Philosophy," took special pains to guard the men of science against wasting effort in attempts at its realization. He seems to have made his denial from the supposition that a knowledge of it would involve absolute or complete knowledge, which he knew to be impossible, as being inconsistent with the fact of evolutionary progress in knowledge.

Its denial by Comte.

But though the formula of such a law would be the

condensed statement of all actual knowledge, and something expected to be confirmed by an absolute or complete knowledge of everything in the past and future, if we could attain that perfection of knowledge; and though, this perfect knowledge being impossible, we could therefore never know the law beyond possibility of doubt (using language in an absolute, not practical, sense), yet we might know it as we know any other induction in which *all* the facts are not known to be included—might know it as we know Evolution, or the Atomic theory of matter—might know the probabilities were infinitely in its favor, and against any future knowledge that would overthrow it. Therefore, while Comte's thought in regard to absolute knowledge was correct, his inference from it that an all-uniting induction is impossible may be a total mistake.

Comte's denial not valid.

The denial of Spencer is concluded from this reasoning: "For, if the successively deeper interpretations of nature which constitute advancing knowledge are merely successive inclusions of special truths in general truths, and of general truths in truths still more general, it obviously follows that the most general truth, not admitting of inclusion in any other, does not admit of interpretation. Manifestly, as the *most* general cognition at which we arrive cannot be reduced to a *more* general one, it cannot be understood. Of necessity, therefore, explanation must eventually bring us down to the inexplicable. The deepest truth which we can get at must be unaccountable. Comprehension must become something other than comprehension before the ultimate fact can be comprehended."[1]

Spencer's denial.

[1] *First Prin.*, p. 73.

Mr. Spencer has accordingly, as I have shown, got down to the Unknowable without any induction that is strictly universal.

Its mistake.

The mistake of the above argument being, as it seems to me, a wrong assumption in regard to what constitutes explanation, I wish, with the utmost respect for Mr. Spencer, to set in opposition to it the following:

Argument against it.

The interpretation or explanation of a special fact is the bringing of the strange fact into a class of facts with which we are familiar, by discovering in it the same characteristics, *along with diverse* characteristics or connections. The diversity is as necessary as the likeness, for without it there is no strangeness—it is the same fact—there is no generalization or explanation to be made. Two species or special facts, at least, are necessary in order to discover and explain or illustrate the genus or generality common to both. The special fact, therefore, explains or makes clear the common quality of the class as much as the common quality explains the special fact. The same of every special class included in a more general class, each one of which helps to illustrate more perfectly that which is common to the whole. The unity can no more be comprehended without the diversity of the special forms than the diverse facts without the unity of the generalization. Hence the *most* general truth will be explained and illustrated by every minor generalization, and by every class and sub-class of those generalizations, down to the most common fact. In short, it will be the most comprehensible truth of all.

Possibility affirmed.

Being conceivable, it is then not necessarily impossible. The perception and estab-

lishment of it would be but a continuation of intellectual evolution—the culminating achievement of the inductive method—as Comte himself acknowledged, "the perfection of the scientific movement." Now, when his own and Mr. Spencer's reasons for denial are apparently taken away, and when so many of the great unities are already pointed out, with a strong prospect of their confirmation, is it not allowable to think that this ultimate unity of all other unities may soon be brought to view?

The Contribution of Philosophy.

If, leaving the ground of Science, we look for what has been done by Philosophy, we find that in the system of Hegel there was reached, not, of course, by induction, the conception of a unity in the nature and the mode of all existence and all movement or evolution, which, regarded simply as a conception—the pure ideal of the law—is apparently the same as that of an all-inclusive generalization. The germ of this was in Fichte's logical process of "thesis, antithesis, synthesis"; it was imperfectly developed by Schelling, and afterward modified and completely formulated by Hegel, becoming his celebrated "Logic." A similar idea, arrived at by an analysis of Number, and accompanied, along with other additions, by a full development of the doctrine of Universal Analogy—naturally favored by the conception, but not before so completely elaborated—has been promulgated as the Integralism and Universology of Mr. Stephen Pearl Andrews.

Description of it.

Schelling's conception was that of a universal polarity, with a common unity of substance, process, or quality, connecting every two poles of extremes of manifestation, in which common unity the opposite extremes become indifferent or identical (Abso-

lute Identity). And this conception of the supposed invariable unitary fact has been so little changed by Hegel and Andrews, that in the formulations of the latter the principal difference to be discovered is that sometimes there is the addition of a fourth element, Triunism, embracing or summing up the two opposites and their common unity in a larger whole, or which may perhaps be considered as the unity of the oppositeness *and* unity of the previous three.

This doctrine, which I think may be fairly regarded as the highest outgrowth of modern speculative philosophy, was arrived at by speculative methods—introspection, or analysis limited to a few domains. It has never been established as a generalization, and consequently has never gained a hold upon the class of minds who reach conviction by the method of Science. The new, American variety of the species, though much of its author's strongly original thought may be valuable, is not likely to meet with a more permanent success than that of its European prototype.[1]

Its defect and failure.

If, then, what Philosophy presents as its nearest approach to a unitary generalization proves a failure, while Science has not yet reached anything answering to that conception; if, further, the idea is not impossible of being realized, it becomes sufficiently reasonable that such a law should be suggested; one that, however much or little susceptible of *a-priori* proof, shall have its claim presented as that of being

The Ultimate to be suggested

[1] It is but justice to Mr. Andrews to state that he claims Universology to be "*a determinate* science, as much so as geometry or chemistry, and not to be classed with any speculative theory or so-called system of philosophy whatsoever."

a generalization, and be submitted to the method of generalization for its final establishment or rejection.

Analysis of the philosophical conception.

Taking the conception just described as the highest product of speculative philosophy, and analyzing it into its involved relations, we discover three varieties of contrast or opposition:

1. The opposition of the Poles, Parts, or Extremes to each other.
2. The opposition of the Poles, Parts, or Extremes to the Common Unity, of Diversity and Unity, of the Connected and the Connection, or of any terms expressing a similar idea.
3. The opposition in the *direction* of these two oppositions—of the Poles, Parts, or Extremes to *each other*, and to the *Common Unity*.[1]

The idea of *unity* will be discussed further on. What is to be observed here is that there is no term belonging to this compound conception, not even unity itself, but possesses its contrast.

Results exclusively in Oppositeness.

This is a remarkable result. That three such thinkers as Schelling, Hegel, and Andrews should be able to convince themselves, even through some unfairness, that polarity constitutes one-half the great, all-including law, while unity is the complemental half, is alone sufficient to make the idea of polarity worthy of respectful treatment. But when

[1] There is, besides these, the contrast of things and relation, whether the relation be oppositeness or any other; but as every conception contains this contrast, there is no reason for taking account of it in this particular case.

we find their whole conception resolvable into opposite-ness and nothing else, it is then suggested that *opposite-ness*, in some sense, may itself prove to be the universal fact.

Prof. Grove, in writing on the correlation of physical forces, thus represents the idea of *correlation:* "The term Correlation, . . . strictly interpreted, means a necessary mutual or reciprocal dependence of two ideas, inseparable even in mental conception: thus the idea of height cannot exist without involving the idea of its correlate, depth; the idea of parent cannot exist without involving the idea of offspring. It has been scarcely, if at all, used by writers on physics, but there are a vast variety of physical relations to which if it does not in its strictest original sense apply, cannot certainly be so well expressed by any other term. There are, for example, many facts, one of which cannot take place without involving the other; one arm of a lever cannot be depressed without the other being elevated; the finger cannot press the table without the table pressing the finger. A body cannot be heated without another being cooled, or some other force being exhausted in an equivalent ratio to the production of heat; a body cannot be positively electrified without some other body being negatively electrified, etc.

Description of Correlation.

"The probability is," he continues, "that, if not all, the greater number of physical phenomena are correlative, and that without a duality of conception the mind cannot form an idea of them." [1]

Its general prevalence.

I purpose here to give this term its largest meaning,

[1] *Corr. and Con. of Forces*, pp. 183, 184.

so as to include, not only the reciprocal production of phenomena, as in the action and reaction of forces, and the reciprocal implication or suggestion of ideas, but also a sense of opposition between the correlated ideas or phenomena.

Correlation in Forces.

Correlation in the domain of forces has been sufficiently exhibited and explained by numerous writers. It may probably be expressed in all cases, whether in physical, vital, or mental phenomena, or between any two of these, as reciprocal action and reaction, or reciprocal increase and decrease, of force between the objects affected. Let us turn to correlation in ideas.

Correlation in Ideas.

All thinkers recognize a small number of pairs of correlative opposites, such as Existence and Non-existence, Finite and Infinite, Relative and Absolute, called *Contradictories;* each term of any pair implying the other, and yet precluding the existence of that other. Added to these is a long list of pairs of ordinary correlatives, suggesting and implying each other, but not contradictories; such as good and evil, whole and part, past and future, cause and effect, etc. The category may be lengthened indefinitely by bringing in, along with the more familiar pairs, a great number of those less familiar, such as elevation and depression, investment and divestment, traction and pulsion, approach and recession, concurrence and counteraction, pendency and support, resonance and sibillation, transcursion and shortcoming, and so on.

A large advance in the extension of this process is indeed already accomplished by a good collection of synonymous and antonymous words made for literary purposes. In Roget's "Thesaurus" the contrast of

terms is carried through nearly all our ordinary language. Many of the words left by the author uncontrasted are also capable of correlation; the process may be continued among technical terms, and in proper names to the extent probably that we can learn their original meaning; till finally the inquiry may arise whether not only all physical phenomena, as suggested by Grove, but all mental phenomena also, may not be correlative, and all relation correlation, each single phenomenon implying its counterparting opposite, and first known to the mind by the contrast of the two.

Correlation in Language.

Suggestion of its Universality.

In some of the best scientific thinkers we may discover a tendency to make their classifications according to a system, which, if polarity were assumed to be the universal law, would be the correct one. Dr. Bastian and Mr. Spencer may be mentioned as examples. The plan is, first a division of the subject into two correlative main branches, then a division of each of these into two, then of each of the secondary divisions into two, and so on repeatedly, carrying each of the larger and smaller branches as far as distinctions may be necessary or possible. Mr. Spencer has made ten classifications of different kinds, large and small, and in nine of these the "divergent and redivergent" order is followed out; some of them, as the classifications of science, being almost perfect types of the method, the defect consisting in the occasional divergence of a branch into three terms instead of two.

Polarity in Classification.

The disposition in this thinker to make contrasted dual distinctions everywhere is very marked, more so perhaps than in any other. Au-

Polarity in Mental Tendency.

guste Comte and the late Justus Liebig also exhibited much of the same tendency. It is manifest in Henry C. Carey, and indeed, more or less of it can be seen in many late scientific writers.

Universal Polaric Classification suggested.

The fact that Mr. Spencer found it possible to make so many classifications, some of them being of the most comprehensive kind, in the manner described, is certainly a very remarkable one; and, if allowed its due weight, leads to the supposition that possibly the same method might, with sufficient patience and effort, be applied in the distributions of every department, and be carried into the finest details of any subject.

The three Suggestions.

Thus from each of three sources—the philosophical conception, correlation, and polaric classification—we have got a suggestion of oppositeness, polarity, or correlation; and from each a large contribution of evidence in its support.

Antithetical distinctions in all the Sciences.

Taking a general observation of the sciences, it may be noticed that in Mathematics distinction in pairs of opposites is the common fact, and threefold division the rare exception. Davies' "Logic of Mathematics," and Comte's treatment of the subject in the "Positive Philosophy," furnish sufficient proof of this. In Mechanics, Physics, Astronomy, and Chemistry, duality is strongly apparent, though with a larger exception of distributions having three or more terms. Botany and zoölogy show a large majority of dual divisions, but with a large exception of the others; this latter fact being possibly due somewhat to imperfect

classification. Anatomy and Physiology show polaric distinctions again largely predominant; and in Psychology, where it has reached its best statement, the threefold distributions are but very few. While in that department of Sociology most fully developed—Political Economy—there is the same large preponderance of divisions with two opposed terms.

In Morals and Metaphysics, those acquainted with the subjects will, I think, admit that the conceptions dealt with (whether rightly or wrongly) are very largely correlative and antagonistic; while those more familiar than the writer with Geology and Meteorology, with Pathology and Therapeutics, and with Jurisprudence, will judge how far in regard to them the statement of general fact here made is true.

In Trinal Distributions.

Moreover, a great many of the trinal distributions can be easily analyzed into dual ones having two terms of one kind against one of the other, as is already done in the familiar instance of the Mineral, Vegetable, and Animal kingdoms, distributed into the Inorganic and Organic, and the latter again into the Vegetable and Animal. The classifications having more than three terms are still more easily resolvable than the trinal ones, and the exceptional cases are thus reducible to a much smaller proportion.

Here, in three paragraphs, are summed up the results of a glance over the principal part of the whole great field of evidence—a field altogether too large to be thoroughly scanned by one man in any moderate allowance of time, and containing an amount of evidence too great to be exhibited in any small space. A collection might be made of polarities, correlations, or antitheses, general and special, as

General predominance of Oppositeness.

manifested in nature and forms, qualities and quantities, structures and functions, individual and social, throughout all these various domains—a labor similar to that done by Mr. Darwin for Natural Selection—and it would have its proportion of influence in predisposing the mind. Its propriety, and the duty of furnishing it when practicable, are admitted. A tolerable present substitute for such proof, however, is the collection, previously referred to, of synonyms and antonyms in language. Though polarity in some of the large generalities of the sciences—laws and principles, large and complex movements, far-reaching characteristics—and also in some of the smallest distinctions, and hence in classification throughout, might be better exhibited by an effort made for that purpose, yet this extensive arrangement of words by contrast, already accomplished, and that, too, without any thought of the possibility of so arranging the whole mass, is, in any case, a fact that ought not to be disregarded.

Polarity in Motion.

But a more important consideration is that, aside from this, one-half, so to speak, of the universal phenomena are given a character of oppositeness by being brought under Mr. Spencer's law of the Rhythm of Motion. In his chapter on the subject in the "First Principles" he has set forth a great number of facts from the various departments of nature and mind, all of which are instances of *correlated opposite movements and phases of movement* in all kinds of actions and reactions—undulations, revolutions, and periodicities. Accepting the law as valid, it being deducible from the persistence of force, and that one-half the evidence of universal polarity is thereby furnished, the other half is then to be supplied by polarity in *matter;*

and this, in addition to what proof is already brought forward, is deducible from the polarity of motion; for opposite movements must cause opposite forms, qualities, conditions, and relations in the matter moved. I cannot do better than to urge my own reader to re-read the above-indicated chapter of Mr. Spencer.

Polarity in Matter.

As long, however, as there remains a considerable body of apparent exceptions no firmly settled conviction can be reached. The next purpose of this essay will therefore be to show an *a-priori* possibility of carrying antithetical distinctions through the whole range of ideas, qualified only by the practical ability to analyze, and thus create a still more reasonable prospect that the polaric divergent and redivergent system of classification may finally be successfully applied in the distribution of every variety of knowledge—a work which is of course left to whomsoever may hereafter be disposed to take it up.

A-priori possibility of Polaric Classification.

It is anticipated that every consideration advanced for this purpose will be at the same time an additional *a-posteriori* evidence of the supposed ultimate law of Correlation, and assist in giving a clear conception of its nature.

Relativity of Knowledge.

The doctrine of the Relativity of Knowledge is probably accepted by all the leading minds of the scientific school, besides many of the metaphysical. This doctrine is that we cannot know or conceive of anything absolute—any one thing or being existing unlimited and alone; that all knowledge or conception implies relation—implies at least two terms or things to

be related. Here is duality or plurality; but as duality has not yet been shown to imply oppositeness, it is not enough, and therefore I propose to cite the testimony of certain eminent thinkers in favor of the notion that relativity implies opposition in its dual elements. As the question is purely of a logical nature, the judgment of one is as good as that of another, supposing them equally capable.

It implies Duality and Polarity.

Pythagoras taught that Number is necessary to the conception of Thing; that is, a number of things—plurality—is necessary to the conception of one thing, plurality being the opposite of oneness. Plato said that to know a thing we must know what it is not; that is, to know its qualities they must be contrasted with the qualities of other things. Zeno, the Stoic, held that, "since nothing could exist without its contrary, no injustice unless there was justice, no cowardice unless there was courage, no lie unless there was truth, no shadow unless there was light, so the existence of good necessitates that of evil." According to Jacob Boehme, "neither knowledge nor consciousness is possible without distinction, without opposition, without duplication." Fichte said the Non-A could not be posited without the A—what Non-A was could only be known under condition of knowing A, its opposite. Schelling and Hegel, as already pointed out, asserted opposition, along with unity or identity, as present in every conception; the same being reasserted by Andrews. Mansel, the disciple of Hamilton, affirmed "existence conceivable only under conditions of polarity and difference." John Stuart Mill said that "a thing is only seen to be what it is by contrast with what it is not." Herbert Spencer states that a thought involves relation, difference, and likeness; a doctrine very similar

to that of Hegel, if difference can be shown to be oppositeness; and, in any case, how can the conceptions of *likeness* and *difference* be obtained except through their *opposition alone?* for there is no likeness or unity between *likeness* and *difference.*

Unity and Difference.

That oppositeness can be carried to universality is asserted by two of these authorities, and apparently supported by all of them; but the idea of *unity* still stands in the way, while *difference* needs to be exhibited as *opposition.* Let us see what can be done with these difficulties.

Analysis of Difference.

Difference is defined as that by which one thing is distinguished from another, or as that which is added to a genus to make a species. Now *genus* and *species* are opposed correlates, while all that constitutes their opposition is this difference added to genus; so that here difference and oppositeness are one. Again, the contradictories are known by their oppositeness, being opposite in all their qualities and quantities; and here, too, that which distinguishes the terms is their opposition, for there is nothing else. But contradictory terms are positive and negative, representing something and nothing, the conceivable and inconceivable, etc., between which the opposition is total—there is no unity or common quality; whereas in the great mass of things known as correlatives the opposition is only partial; for, if things at all, there is at least a common somethingness between them. And from things in which all qualities are *unlike or opposite* except barely a common somethingness, as, for instance, mind and matter, we may go on through things having all degrees of unlikeness and likeness, with the former decreasing and the latter increasing, till we come to those in which all

qualities are *alike* except in some one least particular; as, for instance, two apples from the same tree, that can be distinguished only by their color. The properties belonging to mind are the correlative opposites of those belonging to matter, and having nothing in common except the fact of both being something, we call mind and matter opposites; whereas, with the two apples there is no opposition or correlation in their qualities—both having the same—except their color, which in one may be a yellowish green, in the other a greenish yellow, and so we speak of them as only *different*. It amounts to this, that when the difference is total or very great, we call it oppositeness; when the opposition is but little, we call it difference; and in either case it is the degree of correlativity present, depending on the number and importance of the contrasting properties. As far as the difference extends, so far extends the correlativity.

Difference in Quantity.

Differences of degree, intensity, or quantity, are, like those of quality, expressed in opposed terms, such as major and minor, more and less, many and few, maximum and minimum.

Difference in Groups and Series.

But, it may be asked, when we distinguish one thing out of a group or series of things—as one color out of a scale of colors, or one event out of a train of events—is there correlation then? It would seem so, for when there is nothing else to serve for distinction, the smallest differences may be discovered or described by oppositeness of *position*, as a point to the right or left, a step higher or lower, a color a shade nearer the red or blue, a stage more or less advanced, a time earlier or later, etc. Besides this we can do as is done in metaphysics, by placing the self or ego against the non-ego; we can put the color

red against all others as the *not*-red, the tone G against all that are *not* G, a part against all other parts. And furthermore, any part developed in a course of *evolution* has always an opposite in the part, or sum of the parts, below or prior to it, when it has not developed another one above; as the stem of a plant is opposed to the root till it puts out branches, when these become opposed to the stem or trunk, and both stem and branches to the root.

In a difference confined to *two* things or qualities out of a number, as of two colors, these become opposites by reason of that limitation, the case being virtually the same as though the two things or qualities contrasted were the only ones in existence.

All difference Correlation.

All differences, then, are known and described by the correlative opposition of the *characteristics* which constitute the difference. In other words, the contrasted things are, in regard to those characteristics, opposites. So that difference may be considered correlation, the latter term involving oppositeness, while opposition likewise involves correlation as the means by which it is known.

Unity in Quantity.

As for Unity, it is included under the law, unity of number or quantity having its correlative in plurality, and in variety, diversity, difference, oppositeness, so far as these imply *two or more* contrasted or differing things—that is, so far as they imply *plurality*.

Unity in Quality.

But variety, difference, diversity, have their correlatives in likeness, sameness, identity, and these words mean unity of *quality*, or of that which constitutes the thing itself regardless of number, as a oneness of form, of function, of property, of relation, or even of a combination of these, as when things are alike in many respects, but differ in others. And

this unity is consistent with plurality of number; for it appears in more than one individual thing. If we sometimes speak as though there were different kinds of this unity—unities of structure, method, law, etc.—this, in strictness, is not correct; for unity, in the present sense, is the same thing wherever we find it; the expression, instead of meaning various kinds of unity itself, indicates the various things, method, law, structure, etc., in which unity appears; otherwise stated, it refers to certain characteristics, each of which is the one thing common to a class of things or facts having a variety of other qualities. Oneness or uniformity of a particular substance, quality, or fact, in the presence of many diverse ones, is thus analogous to oneness of number against plurality or the many.

Unity correlative.

Oppositeness, polarity, or correlation, is then opposed to both these species of unity, involving, as it does, both plurality and diversity.

It will be seen, therefore, that correlation, besides determining the opposition of unity and diversity in quality or kind, and of unity and plurality in quantity, number, or degree, also implies that there can be no one *absolute* unity—no unity without something with it or beyond it that shall be its opposite. In different language, though unity might be the next largest generality, yet correlation must extend one step farther back than unity, finding and leaving somewhere an ultimate duality.

No absolute Unity.

"But if there is a unitary law," it may perhaps be objected, "there is then still one unity that embraces everything." Yes, by giving to the word the sense of uniformity, as above; but if correlation is that law, then it is a uniformity of plurality and opposition,

and precludes any real unity of being or movement—any unity (if the expression may be allowed) that is not divisible into two. The unity of law, moreover, would be the same whatever the law, even if it had three or more terms, and necessitated three or more primary principles instead of a duality. And if unity of law be still sophistically claimed as an ultimate unity, while the expression of that law here given is accepted, it will be seen that there is an ultimate diversity in everything else, and, opposing this universal *diversity of fact* to the *unity of law*, correlation is still triumphant.

Inferred probability of Universal Correlation.

If now the analysis of difference and unity above presented appears to be correct, and if difference extends to everything within our experience, may we not assume that we know the law of Polarity with some approach to certainty, and that the work of carrying correlative distinctions and the polaric method of classification through all branches of science may be attempted with a strong expectation of realizing a tolerably complete success? The greatest difficulty of such effort will probably be found in the *minor distinctions*, the antithetical character and relations of which cannot be clearly seen till after the preceding larger distributions have been made. It is from among these small specialties of a subject, therefore, that a great number of temporary exceptions can be drawn; but the considerations just furnished give ground for believing that they will all finally submit to the law.

Analysis of threefold Distinctions possible.

The labor contemplated involves, of course, an analysis of all our threefold distributions. In some of these either term may be set against the two others with perhaps equal propriety; as the solid, liquid, and gaseous states of matter, which

may be contrasted as the solid and fluid, the sensible and insensible, or the intermediate and extreme forms. Any such series can have one of its terms opposed to the others by some superficial distinction, but the problem is to do it by the most fundamental one. This will in many cases be comparatively easy; as in the old classification of mental phenomena into Intellect, Feeling, and Will, which are reducible to intellect and feeling, feeling having its undetermined, confused, or vacillating state, and its determined or positive state, the latter being will. Others, like the three prime dimensions, Length, Breadth, and Depth or Thickness, will present more or less difficulty, but can probably be analyzed; as the three dimensions into two *planes* of dimension or direction, one containing length and breadth, the other, perpendicular to it, containing thickness—height and depth. The same method is to be taken with a large number of these distributions; its success depending upon mental power of analysis. Of those remaining, the single term to be opposed to the two is in some the *indifference* point, or intermediate, against the extremes, as in past, *present*, and future; in others it is the *connection* against the connected, as in production, *distribution*, consumption; in many it is the *united*, *mixed*, or *composite* state of two or more opposites against their separate condition, as in nature, science, and *art;* in still others it is the *whole* against the parts, or the *common entity* against the poles.

The truth (if it be so acknowledged) that all creation, organization, or construction, is a *union* of counterparts, does not constitute an exception to this law; for it is equally true that all destruction is a *separation* of counterparts, and the two processes only exhibit another illustration of its truth.

A collection of the more difficult threefold and other distributions, analyzed into dual correlated ones, might become one feature in a more complete presentation of evidence. But the full amount of this kind of confirmation can be known only through a thorough examination of all departments of the universe, and a reduction of all genuine conceptions in science, philosophy, and art to their proper correlative form, assuming that to be possible. If the law indicated is the true thing, then all being and thought—all coexistence and sequence—all materiality and eventuality—all noumena and phenomena—all law and fact—every actual and possible existence and conception—must furnish its illustration. No thing can be named, no idea formed, no word expressed, that has not its correlative opposite, at least as a negative of itself, if it is not itself divisible by antithetical distinctions.

Full extent of the Field of Evidence.

The proof of Correlation or Correlativity is, in a strict sense, wholly inductive, there being no higher generalization from which it can be deduced. Otherwise viewed, the argument from the analysis of difference and unity may be considered as deductive, difference being admitted as universal. Except this, the nearest approximation to a deductive basis is the relativity of knowledge, of which the new law is an enlarged expression, by making all relativity correlativity. It seems to me more correct to regard the great truths referred to in the whole course of this discussion—the persistence of force and matter, evolution and dissolution, the distinction of subject and object, the opposite-ness exhibited in the philosophical conception, correlation of forces, the correlative terms in language, diver-

Nature of the Proof.

gence and redivergence in classification, the prominent polar distinctions in science, Mr. Spencer's law of the rhythm of motion, the relativity of knowledge, duality in the conception of ideas, the correlation shown in the analysis of difference and unity and of threefold distributions—*all of them as so many classes of facts, or generalizations, going to make up the universal inductive proof and illustration of the ultimate all-inclusive one.*

If, as a final objection, it should be held that correlation itself implies something that is not correlation; that correlation—meaning reciprocal or mutually dependent relation, the equal necessity of each of its terms to the other—must imply some unequal necessity, some relation not reciprocal, something independent, then this may be admitted as true, and still it will scarcely constitute an objection, for correlation or polarity may still be the best expression of the universal fact. We know that the primary thing in any department, subjective or objective, is independent of the secondary; while, conversely, the existence of the secondary is dependent on that of the primary; and this is an unequal necessity. Yet the primary, though existing, cannot be the *primary*, nor be known *as such*, till after the appearance of the secondary as its contrast; and here the mutual dependence, the equal necessity, again comes in. For example, the stem of a plant does not necessarily imply branches, for it may be a reed or a palm, which has none, in which case its correlate is the root; it is not the primary to any branches. But if branches are developed as secondary, it then becomes an opposite to them as their primary; while both stem and branches may be included as the opposite of the root. The same may be said in regard to subsequent develop-

A final objection.

ments, taken as a series, either end of which can be opposed to all above or below, before or after. Though that which is known as the primary may exist independent of the secondary, it still has its correlate in something else; while it cannot be, or be conceived as, the primary, and thus opposed to the secondary, till after the secondary has appeared, as another correlate equally necessary with itself. This explanation applies in all kinds of evolutions, and, duly considered, obviates a host of exceptions that are apparent only. Then, as *dependence* and *independence* are mutually suggested correlative terms, the same being true of *mutual* dependence and *partial* dependence, *equal* and *unequal* necessity; as the very objection has itself been suggested by its correlate; may it not properly be claimed that correlation covers and includes the whole?

Final definition of Correlation.

This naturally brings us to a more perfect definition of the indicated law. And, as to know a thing we must know what it is not, at least according to Correlation itself, so this conception may perhaps be best defined by showing what it is not. It is not sex, or sexism, as might be supposed by certain thinkers in this country, for sex has no meaning beyond the organic domain, if as far as that, while this is universal. It is not, in strictness, duality; for, though the correlated terms are only two, yet one or both of them may include a number of individuals, as *one* and *all*, or *majority* and *minority*. It is not diversity or plurality, for these are the opposites of unity; while Correlation includes both, and is no more one than the other, except in the sense, before mentioned, of being opposed to an absolute positive unity. It is not relativity, for though this implies two or more terms, it does not convey the idea of their

being either opposed or correlated. Polarity does not express the whole of it, for it also leaves out the idea of reciprocal dependence; besides which, it has usually implied a common unity between extremes, a something possessing polar attributes; whereas, there are opposed terms that have nothing at all in common between them. Neither is oppositeness any more correct; for, besides failing to include mutual dependence, it is liable to be understood as antagonism, while the expression required must admit the idea of harmony also; as there are not only antagonistic opposites, like life and death, but harmonious, coöperative, or counterparting opposites, like induction and deduction, as well. Correlation seems the best definition; for it embraces, along with *both kinds of opposition*, the idea of reciprocal dependence or production. To the educated mind it will convey the fullest impression; though to the mass of minds Polarity or Oppositeness may be a better name.

Universal Analogy.

What about universal analogy, the notion that has been so strongly associated with that of a unitary law? may be next inquired. The answer is, that analogy or correspondence, when stripped of the superstition frequently attached to it, means *likeness*, whether of things or relations—nothing more nor less. That likeness commonly called analogy has commonly been a *superficial* likeness—a resemblance between the more external and less important qualities or relations of things; whereas, that likeness upon which all true classification is based is an *essential* likeness—a sameness in the most fundamental characteristics of the objects compared. The inferences drawn from a superficial analogy have generally failed; but so far as a fun-

damental analogy or likeness can be traced the inferences drawn are reliable. Strictly speaking, *likeness* or *analogy* means *sameness to a certain extent*, which may be very large or very small; and the weakness connected with analogy has been in assuming that, because there was a small likeness in some of the external and unimportant particulars, there must be similarity in the fundamental generalities, or some mysterious connection in the relations; which does not at all follow. The fault is not in analogy itself, for its reliability is in exact proportion to the amount of it; the trouble comes from imperfect observation of it, from assumption of it where it is not, from superficial thinking.

Why it has failed.

Mr. Spencer has stated the correct method of discovering true hypotheses (generalizations) to be the comparison of an unknown thing or subject with the known one most nearly resembling it; which is essentially the same process as classification. The comparison of the social body to an animal organism, adopted and developed by him, is an instance of reliable analogy, because the fundamental nature of an organism exists in both.[1]

Instance of true analogy.

After knowing where the danger is in using analogy, and that in estimating its value one resemblance in general qualities is equal to a number of likenesses in minor particulars, the presumption that there is some similarity, more or less, in all things, has a good influence in dis-

[1] If the same analogy were more fully wrought out in its application to the mind; that is, if the organization of the mind and subordinate nerve functions were considered analogous to the governmental organization of a society, a great many facts in mental physiology and pathology could be harmonized and made useful which are now ignored or doubted, or forced into an interpretation they will not bear.

Theory of mental organization.

posing the mind to look for generalizations where otherwise it might not. And the first, most important, and most promising direction in which to look for the strongest analogies is to the *large or small*, the immense or minute, of the same kind; for in these is the least amount of difference—only that of quantity.

Source of surest analogies.

When a dual division and redivision of any domain or subject, according to the polar opposition of the most fundamental characteristics, shall have been commenced in its most general departments, it seems reasonable to expect that the light cast or returned from one of these to its correlative section, or to those most nearly related—and in greater or less degree to all—will be of considerable assistance in further prosecuting the same work, and in giving rise to new developments. There may also possibly be a light cast by their opposition or unlikeness which will be of some service, as well as the analogy. But that either or both of them will be an infallible guide to the quick and easy elaboration of science, without the proper aid of observation and experiment, may well be doubted.

Prospective use of Analogy.

The all-inclusive generalization cannot, as previously stated, be perfectly known till we reach the perfection of all knowledge. But, assuming it to be already suggested, a thorough examination of the accumulations we have may in a few years establish it beyond reasonable doubt—make it as certain perhaps as that of Evolution. Before this can be accomplished, however, there must be the work of a new classification of the sciences as a body. The polaric method recommended for special provinces of science must be extended to universal knowledge, and the uni-

Polaric classification of the Totality.

versal domain. If Correlation is the one ever-present fact, there is then a possibility of analyzing the sum total of things into its dual elements of being, of re-analyzing these, or the combination of them, into primary counterparting sections, the primary again into secondary divisions, and thus continuing the process of divergence and redivergence—the tree-form of differentiation—till all the great branches of the universal existence are traced out, and, wherever there is evolution, according to the order in which they have themselves been evolved. This ramifying development of the departments of nature will of course furnish a corresponding classification of the sciences of those departments, having the same order and filiation; though this may not be the order in which they have arisen in the mind, either of the individual or the race.

The grand test of Correlation.

This universal classification being, when developed to its perfection, the crowning inductive test of the theory, it seems proper enough to attempt making those fundamental primary and secondary dual divisions of the total universe, which, if they bear criticism, shall be the commencement of such unitary development and classification. It will accordingly be my next purpose.

It involves a Theory of the Universe.

In this proceeding will be involved what may be considered a theory of the universe, or, rather, the beginning of such a theory; while the complete carrying out of the classification will require that many, if not all, of the old problems of philosophy yet remaining be met and solved. If, therefore, some of these old problems get decided in an unexpected and somewhat summary way, I hope no one will be so obtuse as to accuse me of deserting the true path, and

of writing speculative metaphysics instead of science. For I am acting on the supposition that my generalization is a true one, which, if completely established, would give me the same right to draw deductions from it that an astronomer now has to deduce from the law of Gravitation. On that supposition this classification is possible, and will sometime have to be made. So that my error, if anything, will be either in foolishly assuming too soon the validity of the law, or in wrong analysis in making the application.

The assumption above is that no fundamental distinction capable of divergent and redivergent development now exists. Mr. Spencer, in his classification, begins with what he conceives to be fundamental, and in the "Concrete" sciences follows a development which appears to agree with evolution. But his scheme as a whole being inconsistent with that here contemplated, it may be explained in advance that, unlike his, this will begin with sciences which according to his definitions are "abstract-concrete," and end with those that are by the same definition most analytic and abstract; Logic, as a science of investigation, or method, and Mathematics, as a calculus—a method or combination of methods for ascertaining truth in regard to quantity—both belonging to Intellectual Psychology, at one of the farthest extremes of development.

Difference with Mr. Spencer.

The distinction of Subject and Object seems to me no more fundamental than that of Organic and Inorganic, or of any special part as opposed to all that remains. Either of these is all-inclusive, but not the most essential, or primary, in the proper sense. Substance and Quality is more basic; and

Defective distinctions.

substance may have more simple qualities at one time than another, which last idea is a point of importance. A single homogeneous whole can be divided in any one direction as well as another; a heterogeneous one cannot. A heterogeneity further characterized by evolution should have some period in its history at which such division will be more appropriate than at any other time. If knowledge is to give an explanation of the origin of things, and if the totality of movement or procedure is expressed in evolution and dissolution, then, obviously, we must go back to a point where there is no evolution, and take account of the raw materials with which that universal process begins.

The Primordial Antithesis.

Therefore I take Something and Nothing —Being and Non-being—as the first pair of correlative opposites.[1] By Nothing is meant Space and Time—the external non-reality—the unconditioned and unlimited, absolute and infinite, immeasurable and indivisible *nothingness*, which is the Ground or Continent of the something. It answers to every description of the Absolute, except the *conscious personality* assumed for it by theologians, and the *force* attributed by Mr. Spencer and other scientists.

By something is meant Matter and Motion—the Content of space and time—the two self-existent and per-

[1] A still more primordial antithesis can be made of Things—including Things *and* Nothings, or positive and negative conceptions, —against the Relation between them—Things and Relation—the Connected and the Connection. But if all relation, whether between thing and thing, or thing and relation, or relation and relation, is *correlation*, then it is the same as to say Correlation and the Subjects of correlation; and as it is the first pair of the subjects of correlation that is sought, Something and Nothing are taken, the other distinction being practically useless.

sistent realities—conditional and limited, relative and finite, divisible and measurable *substances*—the Noumena underlying, or existing in, all phenomena.

These definitions will, however, need further elaboration to forestall some of the main objections that might otherwise appear.

Objection of two nothings.

Space and Time are the purest nothingness we can conceive. Allowing a simple and common expression, they may be called the "nothing in the way" of Matter and Motion. To meet the objection that distinction cannot exist between nothings—that the idea of two nothings is an absurdity—it may correctly be said that they are only one. For, it seems a self-evident statement that Space is known by contrast with that which occupies Space, that is, Matter; Time, by that which occupies Time, that is Motion; in each case the Continent by the Content. We have Time, then, not because there are two nothings, but because there are two somethings. If we had a third substance we might have a third nothing, not because Nothing has any distinctions in itself, but because it is known by contrast with that which occupies it, and which does possess distinctions.

This view finds confirmation when applied to what we may for present convenience call special kinds of nothingness. The absence of all *material* form and substance in any given locality we express by the single word *nothing*, meaning empty, or comparatively empty space. But in speaking of the absence of certain forms of *motion* we have different words, as *darkness*, the nothingness of light; *cold*, *silence*, *death*, the nothingness of heat, sound, life. No thinker will pretend that the first set of these terms mean any real and positive

things. We have them, not because they represent so many forms of Nothing, but because life, sound, heat, and light are so many forms of the something Motion; and we know the negatives only as the absence and contrast of those particular modes of positive movement.

Description of Space and Time.

Space and Time are unconditional, for the nothingness would be the same whether anything were contained or not. They are unlimited and illimitable, for Time is eternal in the past and future, and Space is infinite in all directions. They are indivisible, for however many limits and divisions we may pass through them, or however much they may be occupied, that which is occupied or limited cannot be separated from that which is not; they are not only beyond, and around, but in and through everything—an absolute unity of nothingness. They are immeasurable or unquantifiable, in their nature as well as in extent, for no one ever thought of measuring Space by a yard-stick of Space, or Time with a Gunter's-chain of Time itself: what we mean by a quantity of space is the quantity of matter that might be contained in it; a quantity or length of time is the amount of motion it might contain, measured by some particular movement for a unit, such as a revolution of the earth on its axis, or of a watch-pointer over its dial.

Description of Matter and Motion.

Matter and Motion are uncreateable and indestructible realities, conditioned by the necessity of having space and time in which to exist, limited to an amount that cannot be diminished or increased. There is no infinity belonging to them; not even an infinity of parts or atoms; for however inconceivable to the *imagination* may be the number of drops in the ocean, or sands on the shore—however incapable we may be of numbering even a single hogshead

of these—the *reason* [1] conceives and knows that because there is a limit to the whole, there is an actual limit to the number of the parts, and as truly in regard to the drops in the ocean, or in a thousand oceans, as to those in a pint cup. That matter is not infinite in extent is clear from the single consideration that it moves; if it were infinitely extended there could be no empty space to allow a change of position. Motion is no more infinite than the matter which is the subject of it, either in extent, or in the number of movements. It is only a relative or comparative infinite we mean whenever the word is applied to any actual existence.

Matter as Substance.

Matter is the substance of which all material things are composed, not excepting that which thinks. It may be conceived, when divested as far as possible of its properties, as the simple something which occupies space. It is utterly passive, inert, or forceless. The resistance to pressure which it is said to manifest after being reduced to the smallest compass, is not the resistance of force at all, for nearly all force can be pressed out of it; but simply because its nature is to occupy space it cannot be squeezed out of existence, as it might be if there were no limit to condensation. [2]

For the same reason it is impenetrable. It has size or

[1] It is Spinoza that is entitled to the credit of making originally the distinction between conception by the reason and conception by the imagination; the former referring to that which is possible or impossible, absurd or necessary in itself, the latter referring to the *amount*, *degree*, or *extent* to which a conceivable thing can be taken into the imagination—the former carrying the same representation to all minds capable of logical reasoning, the latter varying with the growth and capacity of every individual mind. We have in it the key to a great deal of confused and contradictory speculation.

[2] This is the resistance referred to by Spencer in the quotation

quantity, and the inherent quality of form, definite or indefinite; but all qualities except form are conferred upon it by relation. It is the conductor and *vehicle* of Motion.

Motion as Substance.

Motion or force is a true substance in the strict signification of the word—the immaterial substance that enters into and constitutes all modes of force, [1] all visible and invisible movements and events, processes and functions, thoughts and feelings, causes and effects. The one word *motion* or *movement* conveys as perfect an idea of its nature as any definition. Its quantity is expressed by *momentum, velocity, intensity;* and, like matter, it may be said to have, under any circumstances, some definite or indefinite form.

Matter and Motion as Correlatives.

Matter and Force are correlative as *material* and *immaterial* substances; and as substances or noumena, persistent realities, the Something, they are the correlates of Space and Time, the Nothing. Though they have a common character in both being substantial, they cannot be resolved into a single essence. The supposition that

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on page 9, as the evidence of Matter, and by him called *force*. The difference does not affect the argument there made against him, as the statements are equally true of real force, that is, Motion.

[1] Though the community of nature between Gravitation and other forces is not yet known, it may be made apparent by a theory recognizing all kinds of attraction as the effect of outside atmospheric or ethereal pressure, which pressure itself results from the insensible motion of gaseous molecules. Gravitation, thus made conceivable, then becomes the correlate, not of Repulsion, but of *Radiation;* and the law of intensity or quantity (inverse proportion to square of distance) has the same explanation in both.

By this interpretation, too, that weak point in the doctrine of the Conservation and Correlation of Forces which regards the *force of position* is made strong, and the whole doctrine unassailable.

atoms of matter are points of force, or that the two are convertible into one another, or into force alone, is an inconceivable notion, connected with the old mistake of assuming a one absolute reality or essence, and scarcely less absurd than that of transcending space and time.

Solution of the Absolute.

It may now be seen that it is only because reality—essence, being, substance—has been wrongly attributed to the Absolute that it has been supposed to be "beyond the reach of human thought," and reason supposed to "require a belief in what was beyond reason." By giving to the Absolute the negative and unqualified character of Space and Time, or *vice versa*, to Space and Time the negative and unqualified character of the Absolute, and thus leaving Matter and Motion free from the mystery always hitherto associated with noumena, the reason is seen to extend to everything just as it is. That philosophical instinct that has always believed in, and sought for, a comprehensible solution of ontological problems is discovered to be justifiable, as is also the logic (of Correlation) that held the Relative and Finite to imply the Absolute and Infinite; for this logic no more requires the Absolute and Infinite to be a substantial reality than the Positive requires the Negative, or the Possible requires the Impossible to be a substantial reality.

No Absolute Unity.

In the discussion of Unity and Difference, it was stated that correlation must extend at least one step farther back than Unity. It does. Although Matter and Motion have a common unity or uniformity in their substantiality, and in all that belongs to that, there is one pair of correlates, Something and Nothing, Reality and Non-reality, between which it is impossible to conceive any common character at all.

Forms, Qualities, Quantities, and Relations.

By this time the reader may be impatient to know what it is proposed to do with conditions, forms, quantities, qualities, and relations. The answer is that these, taking them in the meaning commonly attached to the words—the sense of *secondary*, as applied to qualities—are all phenomenal, that is, changeable and transient, the products of evolution and dissolution. Matter and Motion, persistent and unchangeable, are now to be thought of as they are in their simplest state, where there is no evolution—the insensible condition of both, with which the Nebular Theory commences to build up the universe of forms. They have quantity, by virtue of being limited and divisible; and form, because we cannot conceive of gaseous atoms, or the motions of such atoms, without some definite or indefinite form or direction. Neither can these atoms and movements be conceived without some relations and qualities, however little and indefinite. But no sensible bodies or movements having sensible forms, quantities, qualities, and relations yet exist. Matter and Motion have also relation to each other and to Space and Time; but this least amount of primary relation, form, and quality is that which they must possess if they exist or are conceived at all. So much is inherent in their very nature, and, as inherent, is opposed to those secondary and phenomenal conditions, relations, forms, quantities, and qualities that result through development from the existence and persistence of Matter and Force. [1]

Formal Statement.

Taking the principal distinctions that have been made, and putting them into a con-

[1] The argument of this paragraph is, virtually, that the quality, or sum of qualities, and the thing itself are the same. Even the

densed and formal statement, we have, for the first division:

NOTHING	The *Continent:* Non-reality; Space and Time, unconditioned, absolute, and infinite, unqualified (except negatively), and unquantified, considered as two, but really one.
SOMETHING	The *Content:* Positive Reality; Noumena and Phenomena; conditioned, relative, and finite, qualified and quantified.

Positive Existence—the Relative, the Content, the Something—is then divisible into:

NOUMENA	Self-existent, immutable, and permanent Being; dual Substance; Matter and Motion, as they are in themselves, or in their simplest conceivable state.
PHENOMENA	Changeable and transient bodies and movements, with their forms, quantities, relations, and qualities; the world of nature, eventuality, life, and mind, evolved and dissolved by Force and Matter.

In the distribution of the sciences corresponding to these we have first a science (if

Corresponding Sciences.

substance of a thing is a quality, its substantiality or somethingness. Indeed we might include quantity (in the sense of individual quantities, sizes, rapidities, etc.), as, also, condition, relation, and form, as being the same with the thing itself, as far as they go, that is, as parts of the compound thing. It thus becomes unnecessary to deal with them separately as abstractions.

the word so applied is not a misnomer) of the Negative, Absolute, or Nothing—Space and Time—hitherto included indefinitely under Ontology or Logic, but for which is rather doubtfully proposed the name of Negatology.

Negatology.

Noumenology.

The science of the Positive begins with Noumenology or Ontology proper—a true science of comprehensible substances as they are in their own nature, with the inherent primary characteristics belonging to them. One of them—Motion or Force—is the universal cause. There are two branches of this science, and it then becomes a problem to select from Mechanics, Physics, and Chemistry, [1] with the aid of a subdivision and rearrangement, the materials for the sciences of Force and Matter.

Phenomenology.

Opposed to Ontology or Noumenology is Phenomenology, the science of the evolution of combined Matter and Motion into Phenomena—that differentiating development, before described, of all the sciences, except those just named—a branching hierarchy or tree of knowledge, corresponding with the actual origin, progress, and succession of the various domains of the universe as they have been differentiated

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1 In this connection it may not be entirely wild to raise the question whether the qualities of chemical elements are not dependent mainly on the form of their atoms, the substance of each being supposed the same, and each atom many-sided in proportion to its quantivalence, as, for instance, the carbon atom to have the form of a triangular pyramid, and hence four-sided; while the form itself is produced by the omnipresent conflict of bodies and particles, in some such manner as stones having a variety of shapes may undesignedly be broken from the same material in a quarry. The hypothesis is, however, too new to myself to be recommended with any confidence.

into existence, furnishing, when fully matured, a history of Creation from the days of chaos to the present time, and carrying it on in anticipation through the perfection of evolution into that predominant dissolution that shall return all phenomenal things to the original state.

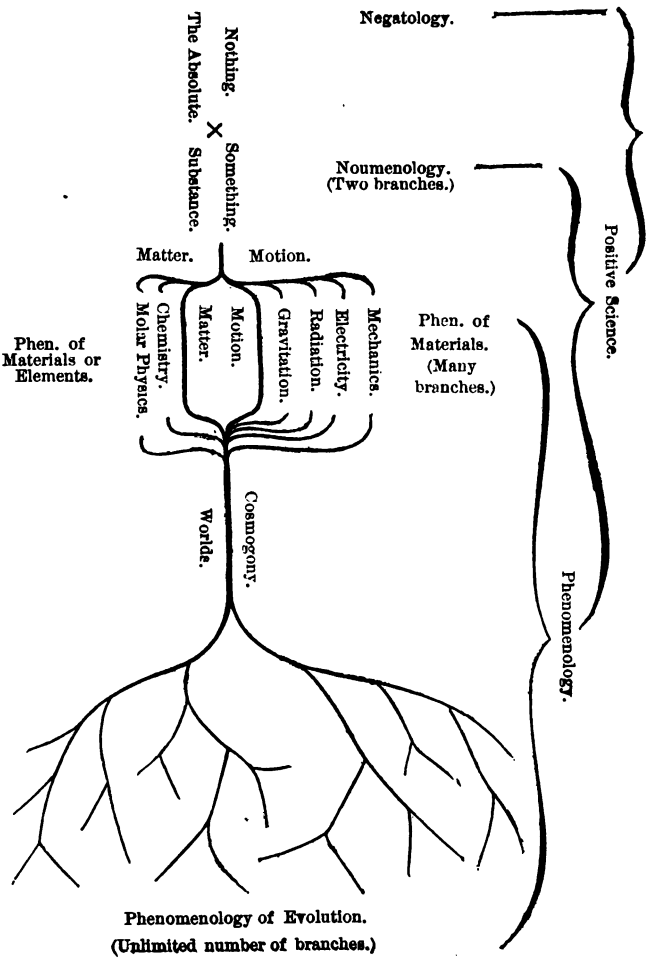
Elements and Evolution.

The science of Substance, with its two branches, is thus placed against the sciences of Phenomena, as the materials of a construction against their preparation and combination, manipulation, or use. Then, as the materials or elements, *Matter* and *Motion*, enter into all phenomena, so the Phenomenology of Matter and Motion—Physics and Mechanics—should be developed, and combined and reproduced in all the succeeding Phenomenology. This is essentially the same idea as that held by Mr. Spencer, and of which his "First Principles" is an exposition, the common character of the phenomenal process, as a whole and in its minor aspects, being expressed in Evolution and Dissolution. His arrangement of materials and mode of progress are somewhat different from those here marked out.

First evolutionary Science.

The beginning of the *evolutionary* process, for both Phenomena and Science, would then appear to be in Cosmogony or the origin of worlds. This is also the starting-point which Spencer has taken in his classification (Table 3) of the concrete sciences. What remains to be done is to decide upon the correctness of that distribution, and the changes, if any, that are needed to make it perfect so far as it extends.

Tabular view. I will now leave this subject by restating, in a condensed tabular form, the classification thus far effected:



Let it here be observed, however, that as the higher forms of force and matter, the organic and social, are not evolved till after the lower ones and their products, they are not combined with the lower ones at the beginning, but afterward, and this the diagram does not represent, as it could not till the classification should be much farther carried out.

Final proof of Correlation.

The only remaining evidence to be here offered in support of Correlation, is the fact that *it answers all the tests by which other great generalizations were at the outset of this discussion shown to be defective.*

Results.

Having now, by all the various evidences, reached such a strong probability in favor of the grand universalization, it may not be inexcusable to mention some of the results that are to be expected from its establishment.

Basis of Deduction.

That such a unity will supply the basis of universal deduction sought for in vain by all philosophy is readily perceived. That it will lead to all knowledge through deduction, even at a vast expense of time and thought, is not at all certain. One of the first truths learned by the assistance of Correlation will be that a union of counterparts is necessary to all successful construction, and hence the equal necessity of inductive and deductive thinking. Accepting this, and making use of the theory in the way all theories are used in science, as a guide and help to experiment and further induction in minor departments, there is reason to believe it will be productive of large and gratifying new developments.

Liberality. Among other important changes in thought that will spring from an acceptance of Correlation will be a presumption of truth in opposed doctrines; and from this a new outgrowth of candor and liberality. This statement, however, does not mean that all sorts of conflicting notions, views, creeds, and doctrines are, with a small exception of real error, capable of reconciliation. On the contrary, many doctrines are purely superstitious and false; others contain faint adumbrations of the truth, requiring to be largely modified or entirely recast; others still are practical truths as opposed to theoretical, and changing with every change of circumstances; while there are yet others which, though apparently conflicting, are equally true, and really harmonious when fully understood. Neither is it intended to predict any immediate harmony of progressive and conservative thinkers themselves. But at the same time, with those who, acknowledging Correlation, must acknowledge that every truth, doctrine, or conception has something, either true or false, for its correlate, the mind will be opened to the recognition of that correlate, and predisposed to look for it, even when the theory cannot guide to it directly.

Correlated truths.

Exclusion of inconceivable notions. The conception will be no less remarkable for what it excludes. If among the minor branches of the tree of knowledge it guards us against overlooking any, on the other hand it clears away from the large limbs of the trunk a vast mass of philosophical pseud-ideas and superstitious rubbish, leaving them few in number and beautifully well-defined in outline.

Disappearance of the Absolute Reality. The disappearance of the Absolute as a positive reality, this grand stumbling-block

of the human intellect in all ages, this last great superstition, from which even the most powerful minds have never been able to free themselves, will be a most striking result. With this disappearance, and the resolution of Space and Time into nothingness, arises the possibility of knowing things in themselves, as they really are, so far as we know them at all—of gaining a clear and simple conception of the nature of substance, quality, and all the various forms of force; the very knowledge that Comte so earnestly warned his disciples against attempting, and which nearly all scientific men have declared impossible. While an absolute reality will be as inconceivable as ever, an actual conception of the Noumena, so long mistaken to be one with the Absolute, will be realized, and be as readily acceptable to the trained thinker as to the ignorant man by whom such knowledge was never doubted, The union of Ontology and Science in the Primary Distribution just made, bringing all knowledge into one body, and taking away all the old ground of speculation, though remarkable as an unexpected development, thus becomes a very natural and rational proceeding. Moreover, it is one not to be regretted, for the human mind never has been satisfied, and any one capable of taking an interest in philosophical questions will, I think, agree with me that it never can be satisfied with an unknowable and inconceivable Absolute Reality placed at the foundations of the universe, causing logical contradictions in thought, and limiting every attempt to understand the nature of things with its "Thus far shalt thou go and no farther."

Conception of things in themselves.

Final Satisfaction of the Intellect.

Personal views. To the above summary of results plainly deducible from Correlation as a universality, I will here add an equally short statement of some conclusions to which my own mind has been led since being acquainted with the law, but which are not yet fully matured, and which the reader who puts no value upon individual speculations is entirely free to neglect.

The disposition to see truth in opposed conceptions and doctrines has enabled me to discover an actual or possible harmony between many of them, and their necessity to each other as counterparts in a complete theory. An immense development, not of eclecticism solely, but of eclecticism and originality combined, is apparently possible and necessary. The present holders of opposite positions see no way of reconciliation, because their minds are fettered by the prevailing assumption that antagonism is natural and unavoidable. But in any case an ultimate harmony will be brought about by a complete knowledge of the whole subject—of all that lies between the two extremes. And if the action of one mind is any indication of what will be done by others, then a belief that there is an agreement, and the disposition to discover it added, will lead to many harmonies not now known or suspected to exist.

Eclectic reconciliation.

Reforms. The most important, perhaps, of all distinctions among correlated truths is that of the Absolute, Abstract, or Theoretical as opposed to the Practical; or the theoretical truth and the practical application of it—essentially the same as that of Pure and Applied science—a division to which, as carried into social subjects, at least, Mr. Spencer is, I think, the only writer

who has given any considerable attention. The first class embraces, among others, nearly all those ideas called *reformatory*, while the other covers all those antagonistic views held by the intelligent conservative. The ability of justifying both these classes of views, and of offering a point of practical agreement that can be supported by the authority of science, appears to me as the ability and means of preventing an inconceivable amount of mental and moral discord and anarchy, and of substituting friendly tolerance and liberality in place of narrow-minded bigotry and hate. The principle is capable of a very extended application.

Personal Deity.

Passing over some theories of less importance, I refer to the conception of a personal Deity. This, which is scarcely more destroyed by placing Matter and Motion at the background of things than by the doctrine of an unknowable Absolute, still has a substitute in that intellectual and moral order of the universe which has always been claimed as the witness of intelligent Divinity, and which, assuming the ultimate perfection of it, answers all the main purposes of such a conception. The personification of it will then remain a practical truth, or practical interpretation of the theoretical truth, so long as the need of such a personal deity is felt by the human mind. The opposition of the theoretical and practical, in this case, instead of creating discordant feeling, will, on the part of the Correlationist, lead him to see the present practical necessity of the counterparting idea of personification; a necessity that has already been illustrated by Mr. Spencer in an essay on "The Uses of Anthropomorphism."

Future existence.

As to a conscious existence after death, it is not at all impossible, nor to myself im-

probable, that the conception of a refined or spiritual matter, correlative to ordinary or gross matter, and of spiritual existences, of some sort, composed of such matter, may yet find a solid basis in the truths of positive science.

Conclusion. There is, of course, no limit to the changes of thought and feeling that may occur if the truth and authority of Correlation shall become finally established. Those mentioned are some of the most important ones that have yet been suggested. Not the least merit of these theories, as of all those advanced in the discussion, is the fact that they are entirely conceivable, and the causes indicated true natural causes; while they are also in harmony with, and supported by, our most common and familiar knowledge. And with a confidence in the great law, thus originated and constantly increasing, I offer it to the careful and critical examination of those capable of doing justice to its claims.

NOTE.—It will doubtless occur to some that more attention should have been given to the subject of Intelligence. The inability to conceive of intelligence as arising out of matter, when the nature of the two seems so entirely different, will be, as it has always been, an obstacle to the acceptance of any view not in accordance with the Spiritualist or Idealist philosophies. In regard to this, biological science shows that intelligence actually has grown up by the slowest and most gradual steps of evolution. And notwithstanding the nature of it has been pronounced inconceivable by the whole scientific world, and called one of the mysteries of the Absolute, all of which are past finding out, the author will further say that he has glimpses of an entirely conceivable, rational, and simple theory of the nature of intelligence as belonging to matter, of consciousness, of the thinking process, of the mental organism, and of the Ego or conscious personality.

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